



ES9-12FR

SPECIFICATIONS

Nominal Voltage (V) 12V

Nominal Capacity

15 min rate (216W to 9.60V)	54Wh
20 hour rate (0.45A to 10.50V)	9Ah
5 hour rate (1.53A to 10.20V)	7.65Ah
1C (9A to 9.60V)	5.70Ah
3C (27A to 9.60V)	3.60Ah

Weight Approx. 5.94Lbs. (2.7kg)

Internal Resistance (at 1KHz) 14 mΩ

Maximum Discharge Current for 5 seconds : 135A

Operating Temperature Range

Charge	-15°C (5°F) to 40°C (104°F)
Discharge	-15°C (5°F) to 50°C (122°F)
Storage	-15°C (5°F) to 40°C (104°F)

Charge Retention (shelf life) at 20°C (68°F)

1 month	92%
3 months	90%
6 months	80%

Charging Methods at 25°C (77°F)

Cycle Use : Charging Voltage 14.4 to 15.0V
Coefficient -5.0mv / °C / cell
Maximum Charging Current : 2.7A

Standby Use : Float Charging Voltage 13.50 to 13.80V
Coefficient -3.0mv / °C / cell

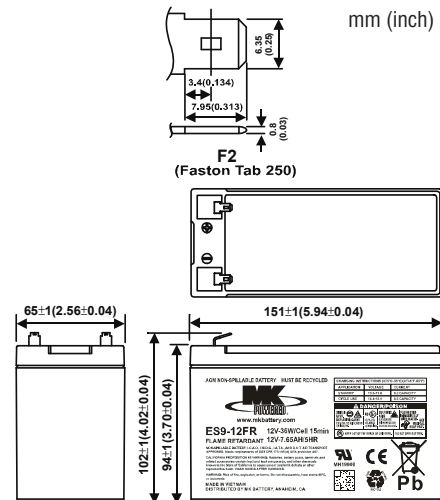
Case Material : ABS
(UL94-V0 Flame Retardant)

Terminal : F2

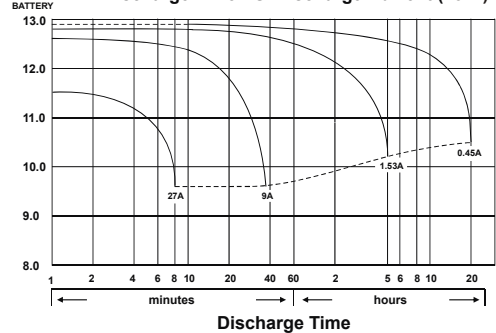
Maintenance-Free Rechargeable Sealed Lead-Acid Battery



DIMENSIONS



(V) FOR 12V BATTERY Discharge Time VS. Discharge Current (25°C)



MK Battery

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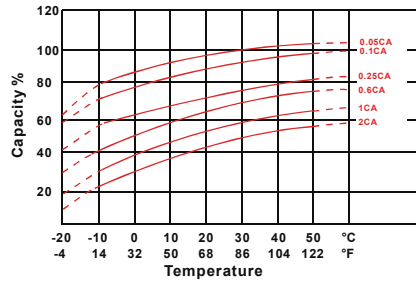
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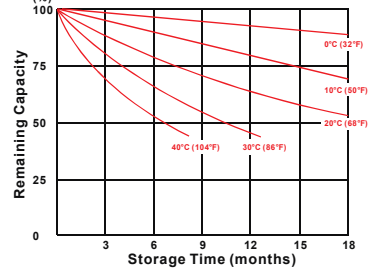


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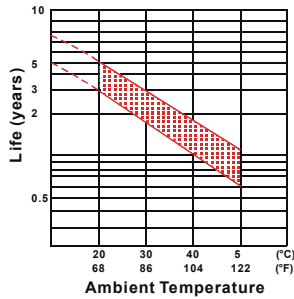
Effect of Temperature on Capacity 25°C (77°F)



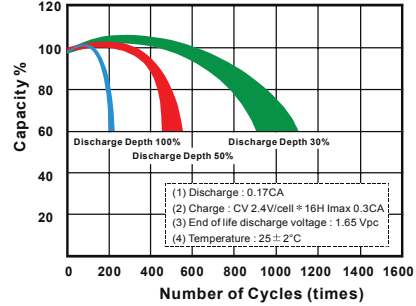
Capacity Retention Characteristic



Trickle (or float) Service Life



Cycle Service Life



- PERFORMANCE DATA

Discharge Rates in Watts to Various End Voltages at 25°C (77°F)

Time	End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min	57.1	60.2	64.7	67.8	69.8	71.2	74.7
10	min	36.5	39.1	42.0	44.0	45.2	46.1	48.3
15	min	30.1	31.2	32.3	33.4	34.0	34.7	35.9
30	min	15.8	16.2	17.0	17.7	17.8	18.0	19.1
60	min	9.97	10.4	10.7	11.0	11.1	11.3	11.5
120	min	5.40	5.56	5.69	5.82	5.87	5.90	5.95
180	min	4.20	4.35	4.49	4.62	4.67	4.75	4.85
240	min	3.40	3.53	3.63	3.73	3.78	3.85	3.92
300	min	2.89	2.99	3.05	3.10	3.12	3.15	3.18
600	min	1.62	1.68	1.71	1.75	1.77	1.78	1.80
1200	min	0.853	0.882	0.902	0.907	0.910	0.913	0.918

- Discharge Rates in Amperes to Various End Voltages at 25°C (77°F)

Time	End Voltage	1.85V	1.80V	1.75V	1.70V	1.67V	1.65V	1.60V
5	min	30.4	32.6	35.0	36.7	37.4	38.5	40.3
10	min	19.1	20.4	21.9	22.9	23.4	24.1	25.2
15	min	14.3	14.9	15.8	16.5	16.8	17.3	18.0
30	min	8.09	8.45	8.93	9.35	9.54	9.77	10.2
60	min	5.17	5.29	5.37	5.45	5.48	5.52	5.57
120	min	2.63	2.72	2.78	2.84	2.86	2.89	2.93
180	min	2.12	2.18	2.23	2.27	2.29	2.31	2.34
240	min	1.69	1.74	1.77	1.80	1.81	1.82	1.83
300	min	1.46	1.51	1.53	1.55	1.56	1.57	1.58
600	min	0.827	0.841	0.855	0.866	0.871	0.877	0.884
1200	min	0.427	0.442	0.451	0.456	0.459	0.462	0.466

All data on the spec. sheet is an average value:

The tolerance range : $X < 6\text{min}$ (+15%~-15%), $6\text{min} \leq X < 10\text{min}$ (+12%~-12%), $10\text{min} \leq X < 60\text{min}$ (+8%~-8%), $X \geq 60\text{min}$ (+5%~-5%)

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